AMENDMENTS TO THE CLAIMS

1–41. (Canceled)

42. (Previously presented) A process for sintering polyethylene having a weight average molecular weight of more than 1,000,000 g/mol, said process comprising:

(a) at least partly disentangling said polyethylene;

(b) heating the at least partly disentangled polyethylene to a temperature between room temperature and the crystalline melting temperature of the polyethylene;

(c) compacting the at least partly disentangled polyethylene at a temperature between room temperature and the crystalline melting temperature of the polyethylene;

(d) heating the compacted polyethylene to a temperature above its crystalline melting temperature;

(e) cooling the polyethylene to a temperature below its crystalline melting temperature.

43. (Previously presented) The process of claim 42, wherein said at least partly disentangling is effected by a process comprising swelling said polyethylene.

44. (Previously presented) The process according to claim 42, wherein said weight average molecular weight is at least 2,000,0000 g/mol.

45. (Previously presented) The process according to claim 42, wherein said temperature between room temperature and the crystalline melting temperatures in steps (b) and (c) is at least 60 °C

46. (Previously presented) The process according to claim 42, wherein said temperature between room temperature and the crystalline melting temperatures in steps (b) and (c) is at least 100 °C

47. (Previously presented) The process according to claim 42, wherein said temperature above its crystalline melting temperature in step (d) is below 250 °C

48. (Previously presented) The process according to claim 42, wherein said process further comprises post-treating said polyethylene after at least steps (a)–(d).

49. (Previously presented) The process according to claim 48, wherein said post-treating includes cross-linking said polyethylene.

50. (Previously presented) A process for sintering polyethylene, said polyethylene having

(i) a weight average molecular weight in the range of 2,000,000–10,000,000 g/mol;

(ii) a co-monomer content of up to 5 wt%; and

(iii) a melting temperature of at least 115 °C; and

said process comprising

(a) heating said polyethylene to a temperature between room temperature and the crystalline melting temperature of the polyethylene;

(b) compacting said polyethylene at a temperature between room temperature and the crystalline melting temperature of said polyethylene.

(c) heating the compacted polyethylene to a temperature above its crystalline melting temperature;

(d) cooling the polyethylene to a temperature below its crystalline melting temperature; and

(e) cross-linking said polyethylene after at least steps (a)–(c).

51. (Previously presented) The process according to claim 50, wherein said temperature between room temperature and the crystalline melting temperatures in steps (a) and (b) is at least 60 °C

52. (Previously presented) The process according to claim 50, wherein said temperature between room temperature and the crystalline melting temperatures in steps (a) and (b) is at least 100 °C.

53. (Previously presented) The process according to claim 50, wherein said temperature above its crystalline melting temperature in step (c) is below 250 °C

54. (Previously presented) The process according to claim 50, wherein said compacting of said polyethylene is effected with a pressure in the range of 10–200 MPa.

55. (Previously presented) The process according to claim 50, wherein said polyethylene comprises co-monomer.

56. (Previously presented) The process according to claim 50, wherein said polyethylene comprises 0.5–5 wt% co-monomer.

57. (cancelled)

58. (Previously presented) The process according to claim 50, wherein said weight average molecular weight is at least 5,000,000 g/mol.

59. (Previously presented) An article obtained by a process according to claim 50.

60. (Previously presented) The article of claim 59, wherein said article has a wear coefficient of less than 3.5×10^{-4} mm^3/mN.

61. (Previously presented) The article of claim 59, wherein said article has a wear coefficient of less than 2.5×10^{-4} mm^3/mN.

62. (Previously presented) The article according to claim 59, wherein said article has a yield strength of at least 5 MPa.

63. (Previously presented) The article according to claim 59, wherein said article has a yield strength of at least 20 MPa.

64. (Previously presented) The article according to claim 59, wherein said article has a tensile strength of at least 10 MPa.

65. (Previously presented) The article according to claim 59, wherein said article has a tensile strength of at least 40 MPa.

66. (Previously presented) The article according to claim 59, wherein said article is selected from the group consisting of artificial implants and orthopedic implants.